

ART. XIII.—*De la Nature et du Traitement du Croup et des Angines couenneuses, étude clinique et microscopique, démontrant: 1. Que les concrétions, source de tous les accidents, sont des produits d'origine parasitaire ou moisissures. 2. Que la base du traitement repose sur l'application de topiques parasitocides, médication aussi rationnelle qu'heureuse en pratique.* Par le Dr. N. JODIN, Médecin du 9^e Bureau de Bienfaisance de Paris, Chevalier de la Légion d'Honneur. Paris, 1859. 8vo. pp. 39. (Adrien Delahaye, Libraire-éditeur.)

A *Clinical and Microscopical Study of the Nature and Treatment of Croup and of Pseudo-Membranous Angina, showing: 1. That the concretions, the source of all the symptoms, are products of parasitic or vegetable origin. 2. The basis of treatment consists in the application of topical parasitocides, a medication as rational as it is happy in practice.* By Dr. N. JODIN, &c. Paris, 1859. 8vo. pp. 39.

CROUP is a fearful disease. To determine its nature and the best mode of treatment, Napoleon I., in 1807, ordered a "*concours*," which set the whole medical world to work, and brought forth hundreds of memoirs, in which may be found a general exposition of the science of the time. Its summary may be stated in the following propositions:—

1. The anatomical character of croup is the formation of a false membrane in the windpipe, and its functional symptoms are cough and a peculiar alteration of voice, with paroxysms of suffocation. With some authors the functional symptoms alone constitute croup, without the expulsion of false membrane, in cases of recovery, or its presence after death; they say that the formation of false membrane had been prevented either by the activity of the treatment or the rapid course of the disease.

In modern medicine, cases without false membrane form the pseudo-croups, among which is placed the acute asthma of Millar, spasm of the glottis, &c. In the opinion of Dr. Jodin, the addition of the class of pseudo-croups constitutes a source of error as to the symptoms and mortality of true croup.

2. This disease is distinct from the Syriac ulcer of Areteus or gangrenous angina, which, when present with croup, is considered to be a complication. Nevertheless, some authors, having observed in epidemics of gangrenous angina that croup commenced in the throat and extended into the larynx, confound the two diseases. In this they agree with popular sentiment, which recognizes the suffocation and death, without regarding the precise site of the anatomical product.

3. It appears to have existed through all time, although false membrane in the windpipe was mentioned for the first time in 1576, by Baillou. To it must be referred the *angina gravissima*, the *pulmo repletus* of Hippocrates. It must have been more frequent in the second half of the last century, if we may judge from the great number of memoirs which appeared in that period.

4. It appears in countries very different from each other, north and south, east and west—in Sweden, England, Germany, France, Switzerland, Spain, Italy, and America.

Humidity of climate or of the season seems to favour its development.

5. It is generally attributed to a principle diffused through the air.

6. It is contagious according to some, non-contagious according to others, who, however, admit the contagion of gangrenous angina.

7. Everywhere false membrane is considered to be the product of a peculiar inflammation.

8. Authors differ as to the asphyxiating action of the false membrane: some regard it as the sole cause, acting like a foreign body; others attribute to it only a part in the suffocation, in the production of which they include both the inflammatory tumefaction and the spasmodic condition.

9. The treatment is in accordance with these differences of opinion. The first direct all their therapeutic means against the false membrane, seeking to dissolve and detach it from the mucous lining with calomel in large doses, sulphuret of potassa, polygala, or to expel it by emetics, and tracheotomy.

The latter, consistently with their theory, and alleging besides that to one false membrane expelled succeeds another as long as the productive cause—inflammation—continues, place no great value on all these means; if they employ any of them, mercury or emetics, it is only as auxiliaries. They reject the sulphuret of potassa as not having been approved, and they condemn tracheotomy as useless and dangerous. They attack the inflammation by letting blood, by revulsives or derivatives, vesicatories, sinapisms, purgatives, &c.

10. The preservative treatment consists only in hygienic precautions, to protect children against cold and humidity.

This summary shows that the "*concours*" has been useful, because it brought together whatever was known of the disease in different parts of the globe, and spread this information before the medical public; but this is the only fruit it has produced. It did not determine the nature of the disease, for we learn very little by being told that it is a peculiar inflammation, nor has it determined the treatment.

Discoveries in medicine are not made either at an appointed time or by command. Truth often obstinately eludes the most profound and persistent investigations, and is at last revealed by some fortuitous circumstance, such as the fall of an apple.

Ten years later, M. Bretonneau did more for croup than all the distinguished physicians who participated in the "*concours*." An epidemic angina maligna, which prevailed at Tours from 1818 to 1821, afforded him the opportunity for observation.

He began to doubt the gangrenous character of the angina from observing at an autopsy that the *velum palati* enveloped in sloughs presented, on being divided from behind forwards, a red section betwixt two superficial gray lines. His doubts were increased by seeing, during life, all the soft parts of the back part of the mouth, which, while covered by sloughs, seemed a putrid mass and deeply sphacelated, remained, on the detachment of the sloughs, in a state of perfect integrity.

At the *post-mortem* examination of a subject who had presented a gray tint throughout the whole back part of the mouth, and who had perished with symptoms analogous to those of croup, he found in the laryngo-tracheal passage a tube of white, supple, elastic membraniform substance, extending downwards to the last bronchia, and continuous above with the sloughs which still covered the isthmus faucium; on removing these supposed sloughs, he saw that the face which rested upon the mucous membrane was neither gray nor blackish, like that exposed to the air; it had the consistence, whiteness, and lustre of that which had been drawn from the trachea; the mucous membrane did not present the slightest trace of gangrenous alteration; the red spots, themselves pict in deeper red, without erosion, without thickening of tissue, were the only observable marks of inflammation; the redness was still less decided than in the trachea.

Continued observation through the epidemic constantly yielded the same

results. With a single exception, the false membrane of the laryngeal tube was always consecutive to concretions in the throat.

From his experience he deduced the following conclusions:—

1. The gangrenous character of concretions of the throat in gangrenous angina is only in appearance; this appearance is due to putrid decomposition, favoured by the moist heat of the mouth and by the action of the air.

2. These concretions are in fact false membranes, in every respect identical with those of croup, which are only an extension of them.

3. The identity of the affections leads to that of the disease.

4. This disease is a specific phlegmasia, consecutive to a diathesis, and for which he proposed the name diphtherite, designed to distinguish it from other inflammations.

In the treatment of this disease, M. Bretonneau relies chiefly on the application of caustics. When the concretion has descended into the throat so far as to be beyond the reach of caustics, he recommends, as a last resort, mercury and tracheotomy.

Diathesis and specific phlegmasia have been received without discussion, and have never been criticized.

Cauterization has been variously received. It has been adopted as the only means of treatment by some physicians, who, without troubling themselves more than did M. Bretonneau as to whether or not it was in harmony with theory, applied it energetically from the beginning, and generally with success.

It has been accepted with reserve by a majority of physicians, who, to reconcile practice with theory, have added it to the treatment in use; but, little confident in its efficacy, and fearing extensive or deep sloughs, they have had recourse to it only tardily, when they saw the affection advance in spite of the antiphlogistic treatment, and applied it timidly, selecting the most feeble caustics. They reckon more cases of failure than of success.

It has been attacked, particularly in later years, by physicians who oppose it on the ground that they cannot admit the omnipotence of the action of a remedy purely local against a diathetic product or one from an internal cause, renewing the old charge of adding an artificial inflammation to an inflammation already existing, and proscribing it absolutely. They advise alkaline preparations, as alone capable, they say, of destroying the primary cause of the affection, the plasticity of the blood. Though logic is on their side, practical results are not favourable to their views.

For the present, chlorate of potassa has succeeded the alkaline preparations. It is greatly in vogue; it is employed in a host of diseases in which an alteration of the blood is suspected. Failures come; already M. Blache and others have remarked that it is without action in laryngeal croup, and it will be abandoned in its turn, and cauterization will be revived, to be again attacked.

These attacks, incessantly renewed against cauterization, are fatal to it, for a simple reason—it is inconsistent with theory.

A medication purely empirical may be sustained without theory; there are so many things inexplicable in medicine—as, for instance, the action of mercury in the cure of syphilis, and of quinia in paludal intoxication. But reason will always refuse to admit a medication, however successful it may be, if it is inconsistent with theory; for it then implies contradiction, and in medicine, equally with other sciences, contradictory principles are not tolerated. When placed face to face, one must necessarily be false. Which is here false, the medication or the theory?

Cauterization may invoke in its favour numerous incontestable facts.

In therapeutics it is often very difficult to determine how much is due to medication, and how much to the *medicatrix naturæ*; but when a remedy is frequently repeated, and the same result uniformly follows its application, this action must be acknowledged.

Diathesis is a pure hypothesis, admitted to explain the formation of false membrane and its dissemination.

The formation of false membrane is rather against than in favour of diathesis. Under various circumstances in which it is produced, we find, in place of diathesis, a local cause. It is the most ordinary termination of serous inflammation; but then it is due only to the anatomical arrangement of the inflamed parts, of which it is the product, inclosed in a sac without opening, incapable of being freely poured out exteriorly, as in cutaneous or mucous phlegmasia, it becomes organized in false membranes, when it is not of a nature to rupture the pouch which contains it. It takes place around foreign bodies, to which it forms an isolating envelop, on the surface of blisters, or on the vesical mucous membrane in subjects where cantharides have been absorbed; but there we still find a local cause applied directly upon the part affected, or conveyed to the bladder in the urine. There is not the shadow of diathesis. In all cases, it is true, the false membrane remains circumscribed, as M. Bretonneau has judiciously remarked. It is disseminated in croupal affections.

Dissemination is the grand argument put forward in favour of diathesis in croup as in eruptive fevers.

But dissemination is not peculiar to diathetic affections. It is observed also in itch, and the *tinea* produced by a parasitic animal or vegetable. Consequently, of itself, it proves nothing either for or against diathesis.

But if we follow the course of dissemination when it spreads on the skin, we find a peculiarity which furnishes a strong argument against diathesis; it is, that the affection attacks exclusively the surface of blisters, leech bites, or the edges of the wound made in the trachea; the post-aural region, the vulva, the fingers or toes ulcerated by chilblain. Every-body has observed these facts, and passed them by without giving them the least consideration, except to make them available in favour of diathesis. All these points, often distant from each other, have been regarded only as different causes; here vesication, or a cutting instrument, post-aural scrofula, the action of the nails on the vulva, ulcerations of the toes from chilblain; that these determine an alteration, physical, common, consecutive to the tearing or raising the epidermis, the denudation of the skin. No one has observed, what, however, is as clear as day, that this denudation—existing previously to the invasion of the skin by the affection, which respects every part, which preserves its protecting epidermis—singularly resembles all affections inoculable, or from external cause, and especially the mould of fruits, which suffer only when the envelop is injured, either by friction or the puncture of a worm. Croupal affections are identical with those of the mucous membrane, with which they are continued on the edges of wounds of the trachea; it is probable that what happens on the skin occurs on the mucous membrane, although epithelial abrasion may not be always so apparent.

Croup is communicated by respiration and by inoculation.

The disease has been carried into a place where it did not previously exist, by an individual going from an epidemic centre, and communicating it to those who approached him, or who only inhabited the same apartment.

It has been respired by physicians who have watched at the bedside of patients (Blache fils, Valleix).

It has been inoculated upon the lip, in the mouth, or in the nasal fossæ of the physician who cauterized the throat (M. Gendron), or who did tracheotomy (M. Herpin de Tours), by concretions ejected by a convulsive cough, in the first instance from the throat, and in the second from the opening made in the trachea.

It has also been inoculated on the foot where excoriated by chilblain, and by contact with a portion of expectoration from a patient.

There are physicians who do not admit the contagion of croup. They object that the instances of inoculation belong to angina, and not to croup, which is a different disease. But the inoculation, above stated, produced by laryngo-tracheal false membrane, overthrows this objection. It is urged, too, that attempts made to inoculate animals with croup have failed. The same objection might be brought against diseases generally reputed contagious, as smallpox and itch. Contagion alone is not enough to produce the disease; there must exist, also, susceptibility in the subject. A principle contagious in man is not necessarily so in animals. Besides, the same subject may be apt to contract it at one time, and become refractory to it at another, and *vice versa*.

If the contagion of croup be denied in the sense of Fracastor—that is, having power to reproduce the germ from which it originated—there is one point on which all are agreed, that is, contagion in the Hippocratic sense, namely, that it is produced by a principle diffused in the air.

2. The disease is developed without *initial fever*. Fever may exist at all periods of croup, even in the beginning; but it never pertains to the croup itself; it is always symptomatic of another disease, which may be pre-existing, as scarlatina; intercurrent, as pneumonia, or consecutive as phlegmon of the submaxillary glands; and in this last case it takes the character of suppurative fever, mentioned by all authors who admit the existence of fever in croup; it is enough to be advised of the cause of errors to avoid them. Every impartial observer, who encounters a fever, should always find by diligent search, the disease of which it is only a symptom.

3. The *local affection* is developed in a peculiar manner, very different from that of diathetic affections.

It begins by white points, transparent beneath, and around which is perceived a redness altogether superficial, and without the least swelling, constituted by a very fine vascular injection, and by little ecchymoses.

Later, these points spread in all directions, from spots, striæ, or bands, which throw out bridges, unite with each other, and by forming more or less extensive masses, without however any regularity. At the same time the concretion thickening, loses its transparency, changes colour, becomes deeper, gray, brown, or blackish, the thickness being always more decided at the centre than at the periphery. The peripheric redness, in a manner, precedes the concretion, accompanies the tumefaction, and forms a sort of border, which gives it a sunken appearance, and the aspect of a sordid ulcer (*crustam circumveniunt rubor excellens et inflammatio*, Areteus). This tumefaction belongs less to the mucous membrane than to the sub-mucous cellular tissue. This border and the subjacent mucous membrane, bleed on the slightest touch. The development of the concretion is always more or less rapid; it is sometimes found established on parts which a few hours before appeared to be perfectly sound.

The concretion, at first adherent, finally detaches itself, and leaves float-

ing shreds surrounded by puriform matter; sometimes it forms submucous abscesses. The local disease, and the local effects produced by it, may be joined with general phenomena, adynamia, or convulsions.

1. Contagion supposes the existence of a morbid principle, whose origin is external. This principle can be only a miasm, a virus, or foreign body; all external morbid principles are necessarily arranged in one of these categories.

Is this miasm? The absence of initial fever is in conflict with this idea. Because all miasms introduced into the economy constantly determine febrile reaction, unless they instantaneously destroy life. They also provoke—in plague for example—buboes, which have been assimilated to the submaxillary engorgement of pseudo-membranous angina, and this has been adduced as an argument in favour of their miasmatic nature; but it is valueless, because this engorgement is met in some cases in which it is a result of mere vicinity, in the groin from excoriation of the foot, in the axilla from panaris.

Is it a virus? The absence of fever opposes the idea of a virus; for the reason that fever constantly precedes the appearance of virulent exanthemata. This law has no exception, be the virus what it may; be it introduced by respiration or inoculation. Only in the last case, it is on the point where there was a preparatory action entirely local; but fever always announces the general infection, and precedes the constitutional exanthema, whatever may have been the duration of incubation, whether some days, as in variola, or many months, as in syphilis or hydrophobia. We may add, this exanthema undergoes an anatomical evolution, which is never the case in the croupal affection, which appears from the start, and gives, if we may use the expression, both fruit and flower at the same time.

If this principle is neither virus nor miasm, it must necessarily be a foreign body.

Is this foreign body inert, acting like a thorn or cantharides, or is it an agent which reproduces itself? The extensive character of croup is opposed to the first supposition; cantharidal false membrane remains circumscribed.

This agent which reproduces itself must be animal or vegetable. We know that croupal affections are communicated most frequently without immediate contact with the patient, or with objects which he has touched, and that the communication is only consecutive to denudation of the cutaneous or mucous tegument.

This producing agent cannot be an animal parasite, because it is never deposited on the integument without contact; but, being provided with offensive arms, it requires no previous denudation to establish itself.

Therefore, it must be a vegetable parasite, sufficiently light to float in the air, which serves it as a vehicle; but incapable, with its rounded spores, to fix itself, unless it meets a locality unprotected and already prepared.

These two etiological conditions seem to indicate the vegetable parasite the more clearly, as we find them in all affections in which the presence of a vegetable is admitted as an efficient cause; that these affections are developed in man and other animals, on vegetables or on fruits.

Communication, without immediate contact, has been observed in the tineæ of the hairy scalp, of the face, or other parts of the body; in the muscardine of the silk-worm, in the *oidium* of the vine. Tegumentary denudation has not been indicated in the tineæ, the muscardine, or *oidium* of the vine; but the same is true as to cutaneous croupal affections, and it has not been observed because it has not attracted attention. The tineæ

prefer scrofulous subjects, who always have some cutaneous exanthema, following the operation of the razor, which rarely fails to raise the epidermis upon some points; the *oidium* of the vine appears, especially after bursts of sunshine, which tear the tissues swollen by humidity; the mould of fruits attacks only those whose envelopes have been injured by contusions, or punctured by worms. When mould is found in the interior of fruit, we are sure to find, on close examination, a communication with the outer air. Denudation has been observed in fishes, the integuments of which have been bruised in the nets (Ch. Robin, *Saprolegnia ferax*). Once planted, this mould very closely resembles croupal affections, and follows the same course.

Very expert microscopists have failed to discover anything but false membrane in croup; but their failure is attributed to the mode of seeking the cryptogam. If the subject be living, we must draw out the product or seek it among foreign matters with which it has been expelled; if the subject be dead, and the affection has endured some time, we should seek the parasite among the products he may have thrown about him, false membrane and pus.

The first subjects that came under observation were attacked not with croup itself, but with those affections described as putridity of the gums and gangrene of the mouth, in which there formed upon the mucous lining of the gums and cheeks a whitish, grayish, pultaceous matter, resting upon the mucous membrane, tumefied, livid red, eroded, bleeding on the slightest touch, and ending in true gangrene. This pultaceous matter examined under the microscope by Dr. Bazin, distinguished by his work on tinea, exhibited a very fine, pure, cryptogam and nothing else.

The existence of the mushroom or cryptogam in an affection which, since the time of Aretæus, has been considered to be of the same nature as malignant angina, and since that of Mr. Bretonneau as forming the first link in the diphtheritic chain, which may extend from the buccal and nasal openings to the remotest ramifications of the bronchiæ, induced our author to hope to meet them at other points of the air-passage, and suggested to him that a cryptogam must be the cause not only of the gangrene of the mouth, of blistered surfaces, and of the vulva, met with in subjects attacked with croupal affections, but also of that which springs up on the surface of suppurating wounds, of hospital gangrene, and which behaves exactly like cutaneous croupal affections.

Subsequently concretions from the throat were examined by the microscope, and the cryptogam found, but more or less mixed with false membrane.

At length an opportunity was afforded to examine false membranes which had been expelled from the laryngeal tube through an opening made in the trachea. The first particles examined showed only false membrane; but other fragments of the same product exhibited the cryptogam, though lost amidst false membrane and globules of pus which enveloped it on all sides. Afterwards it was found more readily and less mixed a great many times in the larynx, and four times in the throat of subjects who had sickened after their brothers had died of laryngeal croup, and who were cured before the affection could pass the throat, thanks to prompt treatment. For a moment our author suspected he might have been deceived, and might have fancied that he saw spores in granulations or tubes in fibres of false membrane.

But he declares they were spores such as they have been described and figured by micrographers, such as they are seen in all moulds, rounded or oval, regular, isolated, or grouped in twos, threes, or a greater number,

glued end to end, or joined by a pedicle of more or less length, forming by their groupings chains, from which secondary chains were detached; these were, indeed, sporiferous tubes containing spores in their interior, and permitting some to escape from their free extremity; straight, curved, simple, or ramified tubes, articulated or not, interlaced, entangled, sometimes resembling bunches of gooseberries. There was, also, the empty tube or mycellium. There was no more regularity in the disposition of the tubes than in the grouping of the spores. Here the analogy to the mould of fruits continues. On the human moulds we may follow the evolution of the cryptogams; in their infancy and later on the surface spores only; then sporiferous tubes with or without isolated spores, with false membrane and compact mass; again to all this are joined empty tubes which predominate in the last period, and end sometimes by existing alone; it seems that all the rest had disappeared, as a dry fruit that has cast all its seed. Had any doubt remained now, it would have been dissipated by the work of M. Ch. Robin (*des végétaux, parasites, &c.*); others had previously observed cryptogams in the air-passages with false membrane.

Remak (1845) found ramified fibres of *thallus* in mucus detached from the velum palati of an infant dead from croup. (Ch. Robin, p. 513.)

Vogel states that upon true diphtheritic membranes exuded on the buccal or pharyngeal mucous membrane, the mushroom of thrush has sometimes been found, even when only some points or small white spots were formed.

A host of authors, Eudes Deslongchamps, Rayer, Montagne, Ch. Robin, and others, have found in subjects, men and birds, who had perished from chronic diseases, generally phthisis, throughout the air-passages, even the pleura perforated (M. Rayer), different cryptogams associated with false membranes. These products had been expectorated or were found at the autopsies. In the latter case the cryptogam was on the surface, then came the false membrane interposed between it and the mucous membrane, which was more or less altered, congested, and often ulcerated.

Of the observations referring to croup, that of Remak has been considered valueless by M. Ch. Robin, for the reason that it is incomplete, and does not speak of croupal false membrane.

That of Vogel has been assailed by M. Empis, who, never having found cryptogams on the false membranes which he examined under the microscope, declares that Vogel was deceived, and that he mistook for false membranes products which were not.

Observations, in which the coexistence of cryptogams and false membranes has been established, have not suggested the analogy which there may be between these cases and croupal affections. Besides, the cryptogam has been considered as an epiphenomenon, as a product developed consecutively to the false membrane which serves it as soil.

Dr. Jodin thinks those gentlemen took for the effect what he regards as the cause, and suggests that this difference arises from their modes of proceeding.

They commenced while he ended with the microscope; he had recourse to this instrument only to give to a rational theory founded upon the study of the disease, the support of a sensible fact. He set out to explore a new world without a preconceived idea, armed only with the microscope, and they permitted themselves to be controlled by the microscope, forgetting or not knowing that this instrument, like percussion or auscultation, is a good servant but a bad master; when the study of a disease is commenced with these physical means, and with their assistance an organic lesion is found,

there is great risk of treating lightly, if not omitting entirely, interrogations of the patient and the study of the whole of the disease.

Thus, says Dr. Jodin, is lost the only route which might lead to a knowledge of the evolution of the affection. And this has happened to the micographers. They saw nothing beyond the field of the microscope, and they took the products in the order in which they were presented: the cryptogam on the surface, then the false membrane interposed between it and the mucous membrane, and concluded that the former put forth from the latter, just as they might say that a thorn planted in the flesh, grew from the surrounding pus, the formation of which it had provoked.

However, two circumstances, which they knew perfectly, ought to have enlightened them. 1. The oozing of animal mucous or semisolid matter which immediately determines the presence of the cryptogam, a fact recorded by M. Ch. Robin in several passages of his book; 2. Ulcerations of the mucous membrane remarked in all cases in which they have met the cryptogam. It is as clear as day, in the opinion of Dr. Jodin, that the oozing is the commencement of the false membrane, just as ulceration is the favourable condition for implanting the parasite. But with M. Ch. Robin, they considered the appearance of the cryptogam as an epiphenomenon.

Dr. Jodin declares that all his microscopic observations have given the same results: the proportion of false membrane relative to the cryptogam has always been great according to the duration of the affection, and inversely in recent cases. A concretion taken from the tonsils of a subject, ill less than twenty-four hours, and whose brother had perished fifteen days previously from a consecutive laryngeal croup, presented scarcely anything but cryptogam.

Since the existence of the parasitic cryptogam is demonstrated, we should inquire whether there are not many species of cryptogams which may cause the difference observed in the character of the material products, sometimes membraniform, sometimes gangrenous, as well as that of the effects on the economy, limited to the local affection, or showing itself by the phenomena of general intoxication. We do not know whether the microscope will ever reveal the reason of these differences; we know that in large mushrooms, the structure of which may be observed by the naked eye, it is, nevertheless, very difficult to distinguish the edible from those which are venomous.

Dr. Jodin designates all these parasitic affections under the generic term of *moulds*. In this family are found all the mucous or cutaneous affections in which a cryptogam is recognized as the generator. The mucous membrane furnishes thrush, gangrene of the gums, of the mouth, gangrenous angina, croup, croupal catarrh of the nasal fossæ. The skin will produce membraniform or gangrenous affections, whether concomitant or not with those of the mucous membrane, gangrene of the vulva, and even hospital gangrene, which has never been suspected to have such an origin.

If a monograph of the moulds were prepared, it would be necessary, according to Dr. Jodin, to establish genera, species, or varieties of this family, based upon the differences of their sites and the physical characters of the concretions; upon the absence or presence of the accidents of intoxication, &c. He gives the following division, based upon their situation:—

1st. Superlaryngeal moulds, comprising all those which invade parts situate above the larynx, the mouth, throat, and nasal fossæ.

2d. Laryngo-tracheal moulds.

3d. Cutaneous moulds.

Our author believes that this discovery of the cryptogam sheds light upon different points in the history of croup which have been hitherto inexplicable.

In etiology.—The reason why croup generally spares infants at the breast is, that the milk which they continually swallow forms a coat over the mucous membrane that prevents the cryptogam from taking root. It attacks, in preference, the scrofulous and convalescents from eruptive fevers, because the first have the tonsils hypertrophied, which arrests the cryptogams in their passage, and the second have the mucous membrane deprived of its protective epithelium.

In symptomatology, the absence of initial fever is natural, while the cause of the disease is altogether external. This absence of fever explains how croupal affections may be developed in a latent manner, even in parts accessible to sight; there is nothing to induce an examination of the affected parts, and parents rest in deceptive security until the moment of suffocation, which leads to the belief in sudden croups; the storm, after being abated by the expulsion or displacement of the false membrane, reappears with greater violence, and hence we have intermittent croup. But there is neither sudden nor intermittent croup; the disease is always progressive and permanent.

In diagnosis, the absence of fever becomes a most valuable sign, to which physicians and parents cannot give too much attention. Coexisting with alteration of voice and croupal cough, croup ought to be suspected, and induce an examination of the visible parts. On the other hand, the presence of fever with the same symptoms banishes the idea of croup, though not absolutely, because there may exist a symptomatic fever.

In no case, as a general rule, should an examination of the throat and all parts accessible to sight be dispensed with, and this at every visit, because we know how rapidly the moulds sometimes form.

In prognosis, the reproduction of false membrane being always possible, as long as a spore or reproductive germ exists, the expulsion of false membrane, and a cessation of suffocation, are not sufficient to announce a cure prematurely, which may be cruelly disappointed.

Dr. Jodin, with these views, of course condemns bloodletting in every form, and all antiphlogistic agents in the treatment. The only indication is to kill the cryptogam, and this is effected by topical applications alone.

Of all the parasiticide agents, and he mentions under this denomination, nitrate of silver, chlorohydric acid, sulphate of copper, corrosive sublimate, and actual cautery, Dr. Jodin prefers liquid perchloride of iron, because it completely penetrates the cryptogam, its action is limited to the surface, and it may be absorbed without danger.

Nitrate of silver, he says, forms on the parts first touched, a kind of crust, which prevents the agent from reaching the ultimate attachments of the cryptogam.

We have selected the perchloride of iron, he says, hoping that it would prove not only parasiticide, but a modifying agent of that hemorrhagic condition which constantly exists around moulds. Success has crowned our choice, and we boldly declare it has never failed us in the numerous cases in which we have applied it. Besides, it fulfils a second indication, for the reason that it immediately begets a necessity to spit, and consequently, the expulsion of the false membrane. After this expulsion, only a redness remains, which is dissipated at the end of two or three days, and gives place to the normal condition.

It is indispensable to the success of the operation, 1st, to exercise a cer-

tain degree of pressure on these concretions, because, it has been observed, that a parasiticide liquid which simply runs over them is of uncertain action; and, 2d, to reach all the mould; a point spared may become the source of a new growth.

Dr. Jodin hopes that the topical parasiticide applications will be received by all physicians, even the most circumspect, the moment they are convinced of the efficacy of these applications, as well as of their entire harmlessness.

After each application, the patient is to gargle with cool water, until the parts are entirely cleansed; or water, or a solution of chlorate of potassa may be injected.

The application of the parasiticide agent, in the laryngo-tracheal moulds is attended with great difficulty, but it is not insurmountable. The index finger, protected from the teeth of the patient by a wide metallic ring, reaches the epiglottis, and raises it, and serves to conduct a tube, the entrance of which into the larynx is known by the whistling of air, and through this tube injections may be made. The parasiticide agent thus reaches the concretion, but nothing is attained, unless the whole of it can be subjected to the necessary pressure. And as this cannot be effected, Dr. Jodin suggests that by tracheotomy an opening may be made through which may be introduced sponges charged with the parasiticide liquid, which may be moved upwards and downwards, to cleanse the air-passage.

He urges that tracheotomy is not in itself a dangerous operation. Patients perish, he asserts, not from the operation, or its consequences, but rather from the incessant progress of the membraniform concretion. They die, not because they have been operated upon, but because the operation was too long postponed, or all the benefits derivable from it have not been obtained. The opening in the trachea has been regarded only as a way for the expulsion of false membrane, but never for the introduction of parasiticide agents to prevent its reproduction.

But even when the remedy is thus applied, Dr. Jodin thinks the cure is not certain, because the mould may extend to the ultimate bronchial ramifications, and even if these were reached, death might be consequent upon complicating with pulmonary inflammation. Nevertheless, he claims that the means of certainly arresting the supra-laryngeal moulds is a grand discovery, because it is preventive of those of the larynx.

In cutaneous moulds, the application of the parasiticide agent is easy. Dr. Jodin invites the attention of surgeons to this mode of treating gangrene of the vulva, and hospital gangrene, which sometimes destroys the tissues with frightful rapidity. Although he has had no experience in these cases, he believes that the perchloride of iron will promptly effect cure, aided by substantial diet, generous wines, &c.

We have given succinctly and substantially the statements of Dr. Jodin, under the belief that they may interest our readers, and may be considered worthy of further examination, though we must confess that we are far from being convinced of the correctness of his conclusions. Indeed, it seems to us to be a strong objection to his views, as to the cause of croup, that the disease is most prevalent in the winter, and therefore under circumstances the most unfavourable for the diffusion of cryptogamic spores, or their germination.

W. S. W. R.